Amendments to the Specification

Please amend the Title of the Invention as follows:

~~MANUFACTURING~~ METHOD FOR USE IN THE MANUFACTURING OF A FLUID DYNAMIC PRESSURE BEARING

Please replace the original Abstract with the substitute Abstract submitted herewith on a separate page.

Please amend the below-identified paragraphs of the specification as follows:

[0001] The present invention relates to a method for use in the manufacturing ~~method~~ of a fluid dynamic pressure bearing ~~used as a bearing device for a spindle motor or the like of a hard disk drive device~~, and more particularly to a method of filling an oil ~~filling method into~~ a bearing gap.

[0002] ~~As a bearing for a motor that requires a~~ Various fluid dynamic pressure bearings have been proposed for high rotational precision motors. Examples of such motors include ~~such as a~~ spindle ~~motor used in a~~ motors of recording disk [[drive]] drives, and motors used to drive ~~device for driving a recording disk such as a hard disk or the like or as a motor for driving a~~ polygon ~~mirror~~ mirrors in [[a]] laser beam printers. ~~printer, various fluid dynamic pressure bearings have conventionally been proposed that~~ Generally, fluid dynamic pressure bearings utilize fluid pressure of lubricating fluid such as oil or the like ~~intervened~~ interposed between a shaft and a sleeve ~~for supporting both of them so as to be relatively~~ which are rotatable relative to one another.

[0006] The motor described above has a taper seal section 8 in the vicinity of the upper edge section of the sleeve 3 that is positioned opposite to the thrust bearing

sections 7, 7 in the axial direction, so that the surface tension of the oil and the atmospheric pressure are balanced to form an interface. Specifically, the internal pressure of the oil in this taper seal section 8 is ~~kept to be the~~ maintained at a pressure substantially equal to the atmospheric pressure.

[0007] The following method has been proposed for filling the oil 9 retained between the thrust plate 5 and the shaft 2 and between the sleeve 3 and the thrust bush 6 of the bearing section having the above-mentioned construction. Firstly, a vacuum chamber having the oil stored therein is pressure-reduced, and then, with this state, a stirring machine in the oil is operated to perform a stirring and degassing. After the pressure in the vacuum chamber that supports the bearing is reduced to a vacuum level, the oil is supplied to the bearing-supporting vacuum chamber, and suitable amount of oil is placed at the bearing opening such as the taper seal section 8 or the like of the bearing section under a reduced pressure environment. Thereafter, the environment in the bearing-supporting vacuum chamber is returned to the atmospheric pressure, thereby filling the oil in the bearing gap of the fluid dynamic pressure bearing by utilizing [[a]] the atmospheric pressure.

[0008] However, even in the oil filling method as described above, the oil often bubbles during the filling process. This is because it is extremely difficult, particularly in a mass production process in a factory, to remove the dissolved air to a degree of not forming air bubbles even by stirring and degassing the oil under the reduced pressure. The oil bubbling during the oil filling process hinders a smooth supply from the vacuum chamber having the oil stored therein to the bearing-supporting vacuum chamber. Further, when bubbling occurs at the stage where the oil reaches the bearing-supporting vacuum chamber, the oil may be scattered in a spraying manner in the oil vacuum chamber, thereby staining the bearing and the inside of the chamber with the oil.

[0009] The degassing level of the oil is somewhat enhanced by exposing the oil under the reduced pressure environment and performing [[a]] stirring and degassing. However, [[an]] effective degassing cannot be carried out by [[the]] degassing under a state where the oil is stored in the vacuum chamber, since the area exposed to the reduced pressure environment to the volume of the oil, i.e., the surface area of the oil is limited. In this case, it is possible to increase the area to the volume of the oil by ~~a method of~~ using a large-sized vacuum chamber, or by decreasing the amount of oil stored in the chamber. However, these <u>are not</u> ~~methods cannot be said to be~~ realistic <u>solutions</u> since they deteriorate [[a] productivity ~~caused~~ by ~~the increase in~~ <u>increasing the</u> size of the oil filling device or by ~~the increase in~~ <u>increasing</u> an oil replenishing frequency.

[0010] The present invention aims to provide a <u>method for use in the</u> manufacturing ~~method~~ of a fluid dynamic pressure bearing that can prevent <u>or reduce</u> the likelihood of air bubbles during an oil filling process.

[0011] In the ~~manufacturing~~ method of ~~a fluid dynamic pressure bearing~~ <u>an embodiment</u> according to the present invention, a first vacuum chamber, that stores oil and performs a degassing, is pressure-reduced, and at least at the time of completing the pressure-reduction, the pressure in the first vacuum chamber is made smaller than the pressure in a second vacuum chamber at the time of the operation of supplying the oil into a bearing. This provides that higher pressure is applied on the oil upon the operation of supplying the oil than upon the operation of degassing the oil. The higher pressure restrains the occurrence of air bubbles in the oil at the supplying operation.

[0012] According to another ~~manufacturing method~~ embodiment of the present invention, even after the first vacuum chamber is pressure-reduced to obtain a pressure not more than a predetermined pressure, the reduced-pressure state is kept, and with this state, oil is supplied to a second vacuum chamber to thereby fill in the bearing. The predetermined pressure in the first vacuum chamber is smaller than the pressure in a second vacuum chamber at the time of the operation of supplying the oil into a bearing. The first vacuum chamber is kept to be pressure-reduced, whereby a more perfect degassing of oil can be attained.

[0018] A manufacturing method of a fluid dynamic pressure bearing device according to an embodiment of the present invention will be explained with reference to drawings. It should be noted that the fluid dynamic pressure bearing 10 of Fig. 2 is the same as that shown previously described in Fig. 1, ~~so that the explanation of its construction is~~ and accordingly a detailed description thereof is omitted below to avoid redundancy in the ~~for avoiding the repeated~~ description.

[0019] In the ~~manufacturing~~ method ~~of the fluid dynamic pressure bearing~~ according to the embodiment, a valve B1 is firstly opened and a vacuum pump P1 is operated, whereby air in a first vacuum chamber 100 that is an oil tank is exhausted to be pressure-reduced to a predetermined degree of vacuum PL1. After the reduced pressure level in the first vacuum chamber 100 is confirmed to reach the degree of vacuum PL1, a valve B2 is opened to thereby start a supply of oil*L* from an oil supplying chamber 102 to the first vacuum chamber 100. At this time, a capillary 104 for supplying the oil*L* from the oil supplying chamber 102 to the first vacuum chamber 100 has a needle shape having a diameter to a degree in which the oil*L* is retained by a capillary phenomena. Further, pressure PL2 in the oil supplying chamber 102 is kept to be slightly higher than the reduced pressure level PL1 in the first vacuum chamber 100. Accordingly, the oil*L* retained in the capillary 104 is

dripped as droplets into the first vacuum chamber 100 due to the pressure difference between the first vacuum chamber 100 and the oil supplying chamber 102.

[0023] In order to perform the filling of the oil *L*, an oil injecting opening 108 is firstly positioned above the taper seal section 8 of the fluid dynamic pressure bearing 10 by moving in parallel or by rotating a movable member 110. Thereafter, a valve B4 is opened to supply the degassed oil stored in the first vacuum chamber 100 via a pipe 112. In this case, a needle valve 114 (for example, BP-107D manufactured by Ace Giken Co., Ltd.) is operated ~~to carried out the supply~~ in order to accurately send a first amount of oil V1 set in advance to the oil injecting opening 108.